

环境工程专业培养方案

Undergraduate Program of Specialty in Environmental Engineering

I. 专业介绍 Introduction

西南交通大学环境工程专业萌芽于 20 世纪 80 年代，2000 年正式开设环境工程本科专业，现为国家级卓越工程师教育计划专业、四川省特色专业。本专业坚持“综合发展、质量为本”的办学宗旨，贯彻“工程与科学结合、通识教育与个性化培养结合、拓宽基础与强化实践结合、技术与管理结合”的人才培养思路，切实做到“严谨治学、严格要求”，构建创新化、务实化的综合人才培养体系。近年来，本专业着眼于国家重大战略需求，紧密结合西部大开发和我国交通建设，尤其是高速铁路发展的实际需求，依托学校轨道交通特色平台和服务地方经济建设平台，着力开展区域开发及交通工程建设对生态环境的影响、治理与修复，及其水、气、声、渣污染控制的理论研究和工程实践。已为各级政府环保管理部门、科研院校、企事业单位培养了近千名具有环境工程专业知识、交通运输和区域开发环保特色优势的综合型高级技术人才。

Environmental engineering of Southwest Jiaotong University (SWJTU) started in 1980s. The first formal undergraduate of environmental engineering enrolled in 2000. The major is authorized as the National Outstanding Engineer Education Plan Major and the Special Specialty in Sichuan Province. This major adheres to the principle of "comprehensive development and quality-oriented". We educate students based on the thought of "combining engineering with science, common education with personalized training, theory with practice, technology with management". Students are hard-working with high goals and requirements. Our aim is to develop their capability of innovation and practice through a comprehensive education system. In recent years, based on the national needs of western development and China transportation construction, especially the high-speed railway, we rely on the characteristic of rail transit serving local economic construction to assess the impacts of regional development and transportation engineering construction on the ecological environment, conduct the theoretical research and engineering practice on water, air, sound and solid pollution control and remediation. We have provided nearly 1000 senior technical personnel of environmental engineering to environmental protection and management departments, enterprises, government and scientific research institutes.

专业代码：082502

Program Code: 082502

专业名称：环境工程

Program Name: Environmental Engineering

II.培养目标 Objectives

本专业面向生态文明建设的国家重大战略需求和环境工程领域的国际科技前沿，培养具有人文社会科学素养和可持续发展理念，掌握自然科学、工程科学基本理论和环境工程污染治理、监测评价、规划管理等专业知识，具备社会担当、职业操守、国际视野、创新协作、解决复杂工程问题和持续学习能力的高级专门人才。本专业培养的学生毕业 5 年左右，预期可在环境保护及相关领域独立从事工程设计、运营管理、教育教学、技术开发和咨询服务等工作，并成为业务骨干和中坚力量。

Facing the important national strategic needs of ecological civilization construction and the international scientific and technological frontiers in the field of environmental engineering, this major cultivates students with coordinated development of comprehensive quality who have humanities and Social Sciences literacy and the concept of sustainable development. The students must master the basic theory of natural science and Engineering Science and the professional knowledge of environmental engineering pollution control, monitoring and evaluation, planning and management and soon on. The qualified student should have high-level professional talents with social responsibility, professional ethics, international vision, innovative collaboration, solve complex engineering problems and have continuous learning ability. The students of environmental engineering expected graduation 5 years or so, be able to independently engage in engineering design, operation management, education and teaching, technology development and consulting services in environmental protection and related fields, and become the mainstream and backbone of their business.

III.专业毕业要求 Graduation Requirements

（一）需具备的知识：政治、语言、文学等人文社科基础知识；数学、物理、化学、生物等自然科学以及经济管理、工程管理与经济决策基础知识；环境工程领域的专业基础知识以及环境工程设备、设计和技术的相关专业知识；具备系统的工程实践学习经历，了解环境工程学科前沿发展现状和趋势。

（二）需具备的能力：信息检索、阅读及撰写科技论文与技术报告的能力；国际视野和跨文化的交流、竞争与合作能力，能够就复杂问题与同行进行有效沟通；一定的组织管理、表达和人际交往能力，能在团队中发挥重要作用；能利用学科基础理论和专业知识，选用恰当现代工具客观分析复杂问题，设计并实施包括实验、分析及数据解释等的解决方案；能综合考虑各种制约因素，进行污染控制系统、单元或工艺设计、施工、调试和生产组织管理以及进行环境规划、环境影响评价以及环境管理的能力，并能体现创新意识；能客观分析与评价专业工程实践和复杂问题解决方案对社会、健康、安全、法律、文化以及环境和社会可持续发展的影响并理解应承担的责任；对终身学习有正确认识，具备不断学习和适应发展的能力。

（三）需具备的基本素质：人文社会科学素养、社会责任感和环保工程师职业道德；求实创新态度和意识，以及严谨科学素养；了解环境保护相关的方针、政策、法律法规，正确认识环境工程学科及其技术对客观世界及社会经济的影响，能在多学科背景的团队中承担不同角色；良好的身体素质和心理素质；良好的工程意识和一定的工程素养。

毕业生应达到的知识、能力和素质方面的具体要求如下：

1.工程知识：能够将数学、自然科学、工程基础知识，废水、废气、固体废物、物理性污染、规划与评价、生态工程专业知识用于解决复杂工程问题。

- 1.1 具有高等数学、微积分、线性代数、概率论和数理统计的基础知识；
- 1.2 具有物理、化学等自然科学基础知识；
- 1.3 具有工程图学、电工学、工程力学、流体力学、计算机技术等工程基础知识；
- 1.4 掌握系统的环境工程专业基础知识；
- 1.5 能够将环境工程领域的基础理论和专业知识用于解决复杂环境工程问题。

2.问题分析：能够应用数学、自然科学、工程科学的基本原理，识别、表达、并通过文献研究分析废水、废气、固体废物、物理性污染、生态环境有关的复杂工程问题，获得有效结论的能力。

- 2.1 具有运用基本原理识别和表达环境工程领域复杂工程问题的能力；
- 2.2 能够通过文献查阅，结合所学知识，形成解决问题的初步方案；
- 2.3 能够运用环境工程专业知识，分析复杂工程问题并获得有效结论。

3.设计/开发解决方案：能够设计针对废水、废气、固体废物、物理性污染、生态环境有关的复杂工程问题的解决方案，设计满足特定需求的系统、单元或工艺流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化及环境等因素。

- 3.1 了解并掌握工程设计的基本方法和基本技能；
- 3.2 能够根据目标选取适当的系统、单元或工艺流程，并确定解决方案，完成设计；
- 3.3 能够在设计环节中体现创新意识，并考虑社会、健康、安全、法律、文化以及环境等因素。

4.研究：能够基于科学原理并采用科学方法，对废水、废气、固体废物、物理性污染、生态环境有关的复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

- 4.1 掌握基础实验技能与操作方法，能够进行数据处理；
- 4.2 运用环境工程专业知识，设计出科学合理的实验研究方案，采用合理的数据分析方法对实验结果进行解释；
- 4.3 理解环境领域复杂工程问题中涉及的关键科学问题，设计并开展实验研究，对实验数据进行分析总结，通过信息综合得到合理有效结论。

5.使用现代工具：能够针对废水、废气、固体废物、物理性污染、生态环境有关的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。

- 5.1 能够通过图书馆、数据库等资源进行文献检索；
- 5.2 能够使用计算机语言、工程图形等现代技术工具；
- 5.3 能够运用专业工程设计软件、先进分析测试方法等进行模拟、预测或分析，并能够理解此类工具的局限性。

6.工程与社会：熟悉国家和地方涉及生态环境的政策和法律法规，能够基于工程相关背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

- 6.1 具备社会、健康、安全、法律及文化方面的相关背景知识；
- 6.2 具备合理分析和评价环境工程解决方案产生的社会、健康、安全及文化影响的专业能力；
- 6.3 理解环保工程师在工程实践和复杂工程问题解决方案中应承担的责任。

7.环境和可持续发展：能够理解和评价针对环境与生态复杂工程问题的工程实践对环

境、社会可持续发展的影响。

7.1 了解环境保护和可持续发展方面的方针、政策和法律、法规；

7.2 能够在复杂工程问题解决方案设计中综合考虑对环境和社会可持续发展的影响，并能采取措施加以改进。

8.职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。

8.1 具备健全的身心素质；

8.2 掌握必备的人文与社会科学知识，养成正确的价值观，具有强烈的社会责任感；

8.3 理解并遵守工程职业道德和规范。

9.个人和团队：能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。

9.1 能够在本专业的实践课程中理解个人职责与团队目标的关系，承担好个人义务；

9.2 能够在社会实践等多学科背景下理解个人职责与团队目标的关系，承担好个人义务。

10.沟通与表达：能够就废水、废气、固体废物、物理性污染、生态环境有关的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。并具备宽广的国际视野，能够在跨文化背景下进行沟通和交流。

10.1 能够就环境领域的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文档、陈述发言、清晰表达或回应指令；

10.2 具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

11.项目管理：理解并掌握工程管理原理和经济决策方法，并能够在多学科环境中应用。

11.1 理解并掌握环境工程实践中涉及的重要工程管理原理与经济决策方法；

11.2 能够将工程管理原理与经济决策方法应用于各种环境工程实践。

12.终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

12.1 具有自觉学习和终身学习的意识；

12.2 能够根据职业发展需要选择和调整学习内容，具备自我更新知识和技能的能力。

Required knowledge: basic knowledge of humanities and social science (e.g., politics, language, literature, etc.), natural science (e.g., mathematics, physics, chemistry, biology, etc.), economic management, engineering management and economic decision-making; professional knowledge in the field of environmental engineering such as environmental equipment, engineering design and treatment technology; have systematic learning experience on engineering practice, and know the current situation and development trend in the discipline of environmental engineering.

Required abilities: ability in information retrieval as well as reading and writing scientific papers and technical reports; ability in international perspective as well as cross-cultural communication, competition and cooperation for effective communication with peers on complex issues; ability in organization management, expression and interpersonal communication for playing an important role in the team; be able to analyze complex problems objectively and design and implement solutions including experiment, analyzing and interpreting data and so on using fundamental theories and professional knowledge as well as appropriate modern tools; be able to comprehensively consider various constraints to carry out the design, construction, debugging and productive organization management for pollution control system, unit or process as well as to conduct environmental planning, environmental impact assessment and environmental management; be able to objectively analyze and evaluate the impact of professional engineering practices and complex problem solutions on society, health, safety, law, culture, environment and social

sustainable development as well as understand the responsibility that should be taken; have a correct understanding for lifelong learning, and have an ability in continuous learning and adaption to development.

Required basic qualities: humanistic and social science literacy, social responsibility and professional ethics of environmental engineers; realistic and innovative attitude and consciousness as well as rigorous scientific literacy; know related policies, laws and regulations in environmental protection, correctly recognize the impact of the discipline and technology of environmental engineering on the objective world and social economy, and be able to play different roles in multi-disciplinary team; healthy body and psychology; good engineering consciousness and certain engineering accomplishment.

The specific requirements for knowledge, ability and quality that graduates need to achieve are as follows:

1. Engineering knowledge: be able to apply basic knowledge including mathematics, natural science, and engineering and professional knowledge such as wastewater, waste gas, solid waste, physical pollution, environmental planning and evaluation, and ecological engineering to solve complex engineering problems.

1.1 Have basic knowledge of advanced mathematics, calculus, linear algebra, probability theory and mathematical statistics.

1.2 Have basic knowledge of natural science including physics, chemistry and so on.

1.3 Have basic knowledge of engineering such as engineering graphics, electrical engineering, engineering mechanics, fluid mechanics, computer technology and so on.

1.4 Master systematically professional knowledge of environmental engineering.

1.5 Be able to apply fundamental theories and professional knowledge in the field of environmental engineering to solve complex environmental engineering problems.

2. Problem analysis: be able to apply basic principles of mathematics, natural science and engineering science to identify, express and analyze complex engineering problems about wastewater, waste gas, solid waste, physical pollution and ecological environment and to obtain effective conclusions.

2.1 Have an ability in applying basic principles to identify and express complex engineering problems in the field of environmental engineering.

2.2 Be able to form a preliminary solution to the problem through literature review in combination with the knowledge learned.

2.3 Be able to apply professional knowledge in environmental engineering to analyze complex engineering problems and draw effective conclusions.

3. Design/develop solutions: be able to design solutions on complex engineering problems about wastewater, waste gas, solid waste, physical pollution and ecological environment as well as the system, unit or process for meeting the specific need; and be able to reflect innovation consciousness and consider factors including society, health, safety, law, culture and environment in the design process.

3.1 Know and master the basic methods and skills of engineering design.

3.2 Be able to select an appropriate system, unit or process according to the target, propose the solution, and complete the design.

3.3 Be able to reflect innovation consciousness and consider factors including society, health, safety, law, culture and environment in the design process.

4. Research: Study complex engineering problems related to wastewater, waste gas, solid waste, physical pollution and ecological environment based on scientific principles and scientific

methods, including design experiment, analysis and interpretation of data, and obtain reasonable and effective conclusions through information synthesis.

4.1 Master the basic experimental skills and operation methods, be able to carry out data processing.

4.2 Design a scientific and reasonable experimental research scheme and use a reasonable data analysis method to explain the experimental results based on the professional knowledge of environmental engineering.

4.3 Understand the key scientific problems involved in complex engineering problems in the field of environment, design and carry out experimental research, analyze and summarize the experimental data, and get reasonable and effective conclusions through information synthesis.

5. Modern tools : Develop, select and use appropriate technology, resources, modern engineering tools and information technology tools to solve the complex engineering problems related to wastewater, waste gas, solid waste, physical pollution and ecological environment, including the prediction and simulation of complex engineering problems with understanding its limitations.

5.1 Carry on the literature retrieval through the library, the database and so on.

5.2 Master computer language, engineering graphics and other modern technical tools.

5.3 Master professional engineering design software, advanced analysis and testing methods to simulate, predict or analyze, and can understand the limitations of such tools.

6. Engineering and society: Know national and local ecological environmental policies and laws and regulations. Carry out reasonable analysis based on engineering background knowledge, evaluate the impact of professional engineering practice and complex engineering problem solutions on society, health, safety, law and culture, and understand the responsibilities.

6.1 Have the ability of background knowledge in society, health, safety, law and culture.

6.2 Have the ability to properly analyze and evaluate the social, health, safety and cultural impact of environmental engineering solutions.

6.3 Understand the responsibilities of environmental engineers in engineering practice and complex engineering problem solutions.

7. Environment and sustainable development: understand and evaluate the impact of engineering practice on environmental and social sustainable development for environmental and ecological complex engineering problems.

7.1 Know guidelines, policies and laws and regulations for environmental protection and sustainable development.

7.2 Consider the influence on environmental and social sustainable development comprehensively in the design of complex engineering problem solution, and measures can be taken to improve it.

8. Professional norms: Have the humanities and social science and social responsibility, and can understand and abide by the professional ethics and norms of the project in the engineering practice and fulfill the responsibilities.

8.1 Have a sound physical and mental quality.

8.2 Master the necessary knowledge of humanities and social sciences, develop correct values, and have a strong sense of social responsibility.

8.3 Understand and abide by engineering ethics and norms.

9. Individuals and teams: Have the ability to assume the roles of individuals, team members, and leaders in a team in a multi-disciplinary context.

9.1 Understand the relationship between individual responsibilities and team goals in the

practical courses of this major, and undertake personal obligations.

9.2 Understand the relationship between personal responsibility and team objectives in the background of social practice and other subjects, and assume personal obligations.

10. Communication and expression: Communicate effectively with industry colleagues and the public on complex engineering issues related to wastewater, waste gas, solid waste, physical pollution and ecological environment, including writing reports and design manuscripts, statements, clear expressions or responses to instructions. And have a broad international vision, and communicate in a cross-cultural context.

10.1 Communicate with industry peers and the public on complex engineering issues in the field of the environment, including the writing of reports and design documents, statements, clear expressions or responses to instructions.

10.2 Have a certain international vision, be able to communicate and communicate in the cross-cultural context.

11. Project management: Understand and master the principles of engineering management and economic decision-making methods, and can be applied in a multi-disciplinary environment.

11.1 Understand and master the important engineering management principles and economic decision-making methods involved in environmental engineering practice.

11.2 Apply engineering management theory and economic decision-making method to various environmental engineering practice.

12. Lifelong learning: Have the consciousness of autonomous learning and lifelong learning, and have the ability to learn and adapt to development.

12.1 Have the consciousness of conscious learning and lifelong learning.

12.2 Select and adjust learning content and self-update knowledge and skills based on career development.

IV.学制与学位 Duration and Degree

学制：四年

Duration: 4 years

学位：工学学士

Degree: Bachelor of Engineering

V.主干学科与专业核心课程 Main Subject and Specialized Core Course

主干学科：环境科学与工程

Main Subject: Environmental science and engineering

专业核心课程：水污染控制工程、大气污染控制工程、固体废物处理与处置、物理性污染控制、环境影响评价、环境规划与管理、环境监测、环境工程原理、环境工程微生物学

Specialized Core Course: Water Pollution Control Engineering, Air Pollution Control Engineering, Solid Waste Treatment and Disposal, Physical Pollution Control, Environmental Impact Assessment, Environmental Planning and Management, Environmental Monitoring, Principles of Environmental Engineering, Microbiology of Environmental Engineering.

VI.毕业学分基本要求 Basic Requirements of Credits for Graduation

课程体系 Curriculum System		学分要求 Credits Requirements						
		必修 Compulsory		限修 Distributional Electives		选修 Free Electives		小计 Subtotal
		理论 Theory	实践 Practice	理论 Theory	实践 Practice	理论 Theory	实践 Practice	
公共基础课程 Public Basic Courses	思政类 Ideological Politics Courses	15	2					17
	军事类 Military Courses	2	2					4
	外语类 Foreign Language Courses	6		2				8
	体育类 Physical Education Courses		4					4
通识与多元化课程 General Education and Diversified Courses	“交通天下”通识教育课程（含跨学科课程） Core General Education Courses（Interdisciplinary Courses）							
	多元化课程 Diversified Courses					4		4
	国际课程 International Courses							
	大学生心理健康教育课程 University Student Psychological Health Courses							
	学生成长与发展规划课程 Student Growth and Development Planning Courses			2				2
	劳动教育课程 Labor Education Courses	2						2
	公共艺术课程 Public Art Courses	2						2
学科与专业基础课程 Discipline and Specialty Foundational Courses	数学类 Mathematics Courses	17						17
	物理类 Physics Courses	9						9
	计算机基础类 Basic Computer Courses	4.5	1.5					6
	化学类 Chemistry Courses	8						8
专业教育课程 Specialized Courses	专业核心课 Specialized Core Course	36.5	0.5					37
	专业限修课 Specialized Restricted Courses			4				4

实践教学 环节 Practice Courses	集中性实践教学环节：基本技能训练、工程实践、综合课程设计、社会与文化素质和实践、毕业实习与毕业设计 Centralized Practical Teaching Process: Basic Skills Training, Practical Training, Integrated Curriculum Design, Social and Cultural Quality Practice, Graduation Internship and Graduation Design		36					36
	创新创业实践：创新创业训练计划项目、个性化实验、学科竞赛、创新讲座等 Innovation and Entrepreneurship Practice: Innovation and Entrepreneurship Training Program, Personalized Experiments, Subject Competition, Innovation Lectures, etc				2			2
必修环节 A Compulsory Part	“第二课堂”项目：思想政治与道德素养类项目、学术科技与创新创业类项目、艺术体验与审美修养类项目、文化沟通与交往能力类项目、心理素质与身体素质类项目、社会工作与领导能力类项目、社会实践与志愿服务类项目 "The Second Lesson" Project: Ideological and Political Education and Moral Literacy Projects, Academic and Technological Innovation and Entrepreneurship Projects, Art Experience and Aesthetic Education Projects, Cultural Communication and Interpersonal Skills Projects, Psychological and Physical Health Projects, Social Work and Leadership Development Projects, Social Practice and Volunteering Projects							0

必修环节 A Compulsory Part	大学生综合素质提升、学生体质达标测评 Comprehensive Quality Improvement Courses for College Students, Assessment of Students' Physical Fitness							0
总计 Total								162

VII.课程设置细化表 Course Programs Table

公共基础课程 Public Basic Courses								
共 33 学分，其中必修 31 学分，限修 2 学分，选修 0 学分 A total credits of 33, including 31 for compulsory courses, 2 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class Practice Credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
思政类 Ideological Politics Courses	思想道德与法治 Ideological and Moral Education and the Rule of Law	必修 Compulsory	3	0.4	第 1 学期 Semester 1	马克思主义学院 School of Marxism	3.3,6.1, 6.3,7.1, 8.1,8.2	
	中国近现代史纲要 Conspectus of Chinese Modern History	必修 Compulsory	3	0.4	第 2 学期 Semester 2	马克思主义学院 School of Marxism	8.1,8.2	
	马克思主义基本原理 The Basic Principles of Marxism	必修 Compulsory	3	0.4	第 3 学期 Semester 3	马克思主义学院 School of Marxism	8.1,8.2	
	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics	必修 Compulsory	3	0.4	第 4 学期 Semester 4	马克思主义学院 School of Marxism	6.3,7.1, 8.1,8.2	
	习近平新时代中国特色社会主义思想概论 Outline of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	必修 Compulsory	3	0.4	第 6 学期 Semester 6	马克思主义学院 School of Marxism	6.3,7.1, 8.1,8.2	
	形势与政策 I Situation and Policy I	必修 Compulsory	0	0	第 1 学期 Semester 1	马克思主义学院 School of Marxism	6.1,6.3,7.1, 8.1,8.2	
	形势与政策II Situation and Policy II	必修 Compulsory	0	0	第 2 学期 Semester 2	马克思主义学院 School of Marxism	6.1,6.3,7.1, 8.1,8.2	
	形势与政策III Situation and Policy III	必修 Compulsory	0	0	第 3 学期 Semester 3	马克思主义学院 School of Marxism	6.1,6.3,7.1, 8.1,8.2	

	形势与政策IV Situation and Policy IV	必修 Compulsory	0	0	第 4 学期 Semester 4	马克思主义学院 School of Marxism	6.1,6.3,7.1, 8.1,8.2	
	形势与政策 V Situation and Policy V	必修 Compulsory	0	0	第 5 学期 Semester 5	马克思主义学院 School of Marxism	6.1,6.3,7.1, 8.1,8.2	
	形势与政策VI Situation and Policy VI	必修 Compulsory	0	0	第 6 学期 Semester 6	马克思主义学院 School of Marxism	6.1,6.3,7.1, 8.1,8.2	
	形势与政策VII Situation and Policy VII	必修 Compulsory	0	0	第 7 学期 Semester 7	马克思主义学院 School of Marxism	6.1,6.3,7.1, 8.1,8.2	
	形势与政策VIII Situation and Policy VIII	必修 Compulsory	2	0	第 8 学期 Semester 8	马克思主义学院 School of Marxism	6.1,6.3,7.1, 8.1,8.2	
军事类 Military Courses	军事理论 Military Theories	必修 Compulsory	2	0	第 1 学期 Semester 1	武装部 Security Office	8.1,8.2,8.3, 9.1,9.2	
	军事技能 Military Skills	必修 Compulsory	2	2	短 1 学期 Short Semester 1	武装部 Security Office	9.1,9.2	
外语类 Foreign Language Courses	英语 I College English I	必修 Compulsory	2	0	第 1 学期 Semester 1	外国语学院 School of Foreign languages	5.1,10.1, 10.2	
	英语II College English II	必修 Compulsory	2	0	第 2 学期 Semester 2	外国语学院 School of Foreign languages	5.1,10.1, 10.2	
	通用学术英语 English for General Academic Purposes	必修 Compulsory	2	0	第 3 学期 Semester 3	外国语学院 School of Foreign languages	5.1,10.1, 10.2	
	职场英语 Workplace English	限修 Distribution al Elective	2	0	第 4 学期 Semester 4	外国语学院 School of Foreign languages	5.1,10.1, 10.2	限修 1 门, 2 学分 Limited to 1 course, 2 credits
	交际与文化视听说 Viewing, Listening & Speaking in English -- Communication & Culture							
	语言、文化与翻译 Language, Culture and Translation							
	英语公共演讲 Public Speaking in English							
体育类 Physical Education Courses	体育 I Physical Education I	必修 Compulsory	1	1	第 1 学期 Semester 1	体育学院 School of Physical Education	8.1	
	体育II Physical Education II	必修 Compulsory	1	1	第 2 学期 Semester 2	体育学院 School of Physical Education	8.1	
	体育III Physical Education III	必修 Compulsory	0.5	0.5	第 3 学期 Semester 3	体育学院 School of Physical Education	8.1	

	体育IV Physical Education IV	必修 Compulsory	0.5	0.5	第 4 学期 Semester 4	体育学院 School of Physical Education	8.1	
	体育健康课程 I Diversified Physical Education Courses I	必修 Compulsory	0.5	0.5	第 5 学期 Semester 5	体育学院 School of Physical Education	8.1	
	体育健康课程II Diversified Physical Education Courses II	必修 Compulsory	0.5	0.5	第 6 学期 Semester 6	体育学院 School of Physical Education	8.1	
通识与多元化课程 General Education and Diversified Courses 共 10 学分，其中必修 4 学分，限修 2 学分，选修 4 学分 A total credits of 10, including 4 for compulsory courses, 2 for distributional electives and 4 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求 指标点 Indicators which Support Graduation Requirements	备注 Notes
“交通天下”通识教育课程（含跨学科课程） Core General Education Courses (Interdisciplinary Courses)	“交通天下”通识教育课程（含跨学科课程） Core General Education Courses (Interdisciplinary Courses)	选修 Free Elective	4	0	2-8 学期 Semester 2-8	全校 The whole school	2.2,3.3,6.1, 7.1,8.2,8.3, 9.1,10.1, 12.1,12.2	限选 4 学分 Distributional Elective 4 credits
多元化课程 Diversified Courses	全校跨学科课程 Interdisciplinary Courses of University							
国际课程 International Courses	国际课程 International Courses							
大学生心理健康教育课程 University Student Psychological Health Courses	大学生心理健康教育课程 University Student Psychological Health Courses							
学生成长与发展规划课程 Student Growth and Development Planning Courses	水资源与水环境概论 Introduction to water resource and water environment	限修 Distributional Elective	2	0	第 1 学期 Semester 1	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	2.2,7.1, 9.1,10.1	限修 1 门、2 学分 Limited to 1 course, 2 credits
	固体废物与可持续发展 Solid waste and sustainable development							
	绿色化学与环境保护 Green chemistry and environmental protection							
	生态保护与可持续发展 Ecological protection and sustainable development							
	火灾科学与消防技术 Fire Science and Prevention Technology							
	环境保护与消防安全 Environmental Protection and fire safety							
劳动教育课程 Labor Education Courses	劳动教育课程 Labor Education Courses	必修 Compulsory	2	0	2-8 学期 Semester 2-8	全校 The whole school	1.2,6.1,8.1, 8.2,9.1,9.2, 10.1,12.1, 12.2	
公共艺术课程 Public Art Courses	公共艺术课程 Public Art Courses	必修 Compulsory	2	0	2-8 学期 Semester 2-8	全校 The whole school	1.2,6.1,8.1, 8.2,9.1,9.2, 10.1,12.1, 12.2	

学科与专业基础课程 Discipline and Specialty foundational Courses 共 40 学分，其中必修 40 学分，限修 0 学分，选修 0 学分 A total credits of 40, including 40 for compulsory courses, 0 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求 指标点 Indicators which Support Graduation Requirements	备注 Notes
数学类 Mathematics Courses	高等数学I Higher Mathematics I	必修 Compulsory	5	0	第 1 学期 Semester 1	数学学院 School of Mathematics	1.1,2.1	
	线性代数 A Linear Algebra A	必修 Compulsory	4	0	第 1 学期 Semester 1	数学学院 School of Mathematics	1.1,2.1	
	高等数学 II Higher Mathematics II	必修 Compulsory	5	0	第 2 学期 Semester 2	数学学院 School of Mathematics	1.1,2.1	
	概率论与数理统计 Probability and Statistics	必修 Compulsory	3	0	第 3 学期 Semester 3	数学学院 School of Mathematics	1.1,2.1	
物理类 Physics Courses	大学物理 BI College Physics BI	必修 Compulsory	3	0	第 2 学期 Semester 2	物理科学与技术学院 School of Physical Science and Technology	1.2, 2.1,4.1,4.3	
	大学物理 BII College Physics BII	必修 Compulsory	3	0	第 3 学期 Semester 3	物理科学与技术学院 School of Physical Science and Technology	1.2, 2.1,4.1,4.3	
	工程力学 C Engineering Mechanics C	必修 Compulsory	3	0	第 3 学期 Semester 3	力学与航空航天学院 School of Mechanics and Aerospace Engineering	1.3, 3.1	
计算机基础类 Basic Computer Courses	计算机程序设计基础 Fundamentals of Computer Programming	必修 Compulsory	3	1	第 2 学期 Semester 2	计算机与人工智能学院 School of Computing and Artificial Intelligence	1.3,4.2, 5.2,5.3	
	土木工程制图及计算机绘图 Civil Engineering Drawing and Computer Drawing	必修 Compulsory	3	0.5	第 2 学期 Semester 2	土木工程学院 School of Civil Engineering	1.3,3.1,3.2, 5.2, 5.3	
化学类 Chemistry Courses	无机及分析化学 BI Inorganic and Analytical Chemistry BI	必修 Compulsory	2	0	第 1 学期 Semester 1	化学学院 School of Chemistry	1.2, 2.1,4.1,4.3	
	无机及分析化学 BII Inorganic and Analytical Chemistry BII	必修 Compulsory	2	0	第 2 学期 Semester 2	化学学院 School of Chemistry	1.2, 2.1,4.1,4.3	
	物理化学 B Physical Chemistry B	必修 Compulsory	2	0	第 2 学期 Semester 2	化学学院 School of Chemistry	1.2, 2.1,4.1,4.3	
	有机化学 B Organic Chemistry B	必修 Compulsory	2	0	第 3 学期 Semester 3	化学学院 School of Chemistry	1.2, 2.1,4.1,4.3	

专业教育课程 Specialized Courses 共 41 学分，其中必修 37 学分，限修 4 学分，选修 0 学分 A total credits of 41, including 37 for compulsory courses, 4 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求 指标点 Indicators which Support Graduation Requirements	备注 Notes
专业核心课 Specialized Core Course	土建工程基础 Foundation of Civil Engineering	必修 Compulsory	2	0	第 4 学期 Semester 4	土木工程学院 School of Civil Engineering	1.3, 3.1	
	环境流体力学 Environmental Fluid Mechanics	必修 Compulsory	2	0	第 4 学期 Semester 4	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.3, 3.1	
	环境工程原理 I Principles of Environmental Engineering I	必修 Compulsory	2	0	第 4 学期 Semester 4	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4, 1.5, 2.3, 3.2, 4.3, 6.2	
	环境工程微生物学 Microbiology of Environmental Engineering	必修 Compulsory	3	0	第 4 学期 Semester 4	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4, 1.5, 2.1, 7.2, 12.1, 12.2	
	环境监测 Environmental Monitoring	必修 Compulsory	2	0	第 4 学期 Semester 4	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.2, 1.4, 2.1, 2.2, 3.2, 5.3, 8.3, 9.2, 10.1, 10.2, 12.1, 12.2	
	电工与电子技术 Electrical and Electronic Technology	必修 Compulsory	2	0	第 4 学期 Semester 4	电气工程学院 School of Electrical Engineering	1.3, 3.1	
	工程管理基础 Foundation of Engineering Management	必修 Compulsory	2	0	第 5 学期 Semester 5	经济管理学院 School of Economics and Management	1.3, 3.3, 6.3, 11.1, 11.2	
	环境工程原理 II Principles of Environmental Engineering II	必修 Compulsory	2	0	第 5 学期 Semester 5	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4, 1.5, 2.3, 3.2, 4.3, 6.2	
	环境法学 Environmental Laws	必修 Compulsory	2	0	第 5 学期 Semester 5	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	5.1, 6.1, 6.3, 7.1, 8.3, 10.1, 12.2	

专业核心课 Specialized Core Course	物理性污染控制 Physical Pollution Control	必修 Compulsory	2	0	第 5 学期 Semester 5	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,1.5, 2.3,5.3, 7.1,10.1	
	环境规划与管理 Environmental Planning & Management	必修 Compulsory	2	0	第 5 学期 Semester 5	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,1.5, 2.3,5.3, 6.2,7.1, 8.3,10.1	
	水污染控制工程 I Water Pollution Control Engineering I	必修 Compulsory	2	0	第 6 学期 Semester 6	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,1.5, 2.1,3.1, 4.2,10.1	
	大气污染控制工程 I Air Pollution Control Engineering I	必修 Compulsory	2	0	第 6 学期 Semester 6	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,1.5, 2.1,3.1, 4.2,10.1	
	固体废物处理与处置 Solid Waste Treatment and Disposal	必修 Compulsory	3	0.5	第 6 学期 Semester 6	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,1.5, 2.1,3.1, 4.2,10.1	
	环境影响评价 Environmental Impact Assessment	必修 Compulsory	3	0	第 6 学期 Semester 6	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.2,1.4,1.5, 2.1,2.2,2.3, 3.3,7.1,7.2, 8.2,8.3,9.1, 10.1,10.2, 12.1,12.2	
	水污染控制工程 II Water Pollution Control Engineering II	必修 Compulsory	2	0	第 7 学期 Semester 7	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,1.5, 2.1,3.1, 4.2,10.1	
专业限选课 Specialized Restricted Courses	大气污染控制工程 II Air Pollution Control Engineering II	必修 Compulsory	2	0	第 7 学期 Semester 7	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,1.5, 2.1,3.1, 4.2,10.1	
	环境经济学基础 Foundation of Environmental Economics	限修 Distributional Elective	2	0	第 6 学期 Semester 6	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	11.1,11.2	限修 4 学分 Distrib utional Electiv e 4 credits
	环境生态学 Environmental Ecology		2	0	第 6 学期 Semester 6	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,1.5, 2.1,7.2, 12.1,12.2	

	轨道交通工程污染控制 Pollution Control for Rail Transit Engineering		2	0	第 6 学期 Semester 6	地球科学与环境 工程学院 Faculty of Geosciences and Environmental Engineering	1.4,2.3, 6.3, 7.2	
	专业外语-环境工程 Professional English- Environmental Engineering		2	0	第 7 学期 Semester 7	地球科学与环境 工程学院 Faculty of Geosciences and Environmental Engineering	5.1,10.1, 10.2	
	土壤与地下水污染控制 Soil & Groundwater Pollution Control		2	0	第 7 学期 Semester 7	地球科学与环境 工程学院 Faculty of Geosciences and Environmental Engineering	1.2,1.3,1.4, 2.1,2.2,3.2, 10.1,10.2	
实践教学环节 Practice Courses 共 38 学分，其中必修 36 学分，限修 2 学分，选修 0 学分 A total credits of 38, including 36 for compulsory courses, 2 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实 践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求 指标点 Indicators which Support Graduation Requirements	备注 Notes
集中性实践教学环节：基本技能训练、工程实践、综合课程设计、社会与文化素质和实践、毕业实习与毕业设计 Centralized Practical Teaching Process: Basic Skills Training, Practical Training, Integrated Curriculum Design, Social and Cultural Quality Practice, Graduation Internship and Graduation Design	无机及分析化学实验 BI Inorganic and Analytical Chemistry Experiment BI	必修 Compulsory	0.5	0.5	第 1 学期 Semester 1	化学学院 School of Chemistry	1.3,4.1,9.1	
	无机及分析化学实验 BII Inorganic and Analytical Chemistry Experiment BII	必修 Compulsory	0.5	0.5	第 2 学期 Semester 2	化学学院 School of Chemistry	1.3,4.1,9.1	
	大学物理实验 I College Physics Experiment I	必修 Compulsory	1	1	第 2 学期 Semester 2	物理科学与技 术学院 School of Physical Science and Technology	1.3,4.1,9.1	
	物理化学实验 B Physical Chemistry Experiment B	必修 Compulsory	1	1	第 2 学期 Semester 2	化学学院 School of Chemistry	1.3,4.1,9.1	
	计算机基础绘图 Fundamentals of Computer Drawing	必修 Compulsory	1	1	短 1 学期 Short Semester 1	地球科学与环 境工程学院 Faculty of Geosciences and Environmental Engineering	1.3,5.2,9.1	
	大学物理实验 II College Physics Experiment II	必修 Compulsory	1	1	第 3 学期 Semester 3	物理科学与技 术学院 School of Physical Science and Technology	1.3,4.1,9.1	
	有机化学实验 B Organic Chemistry Experiment B	必修 Compulsory	1	1	第 3 学期 Semester 3	化学学院 School of Chemistry	1.3,4.1,9.1	
	环境工程微生物学实验 Microbiology of Environmental Engineering Experiment	必修 Compulsory	2	2	第 4 学期 Semester 4	地球科学与环 境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,4.1,4.2, 4.3,9.1	

集中性实践教学环节：基本技能训练、工程实践、综合课程设计、社会与文化素质和实践、毕业实习与毕业设计 Centralized Practical Teaching Process: Basic Skills Training, Practical Training, Integrated Curriculum Design, Social and Cultural Quality Practice, Graduation Internship and Graduation Design	环境监测实验 Environmental Monitoring Experiment	必修 Compulsory	1	1	第 4 学期 Semester 4	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,4.1,4.2, 4.3,9.1	
	电子技术与电子工程实验 Electronic Technology and Electrical Engineering Experiment	必修 Compulsory	1	1	第 4 学期 Semester 4	电气工程学院 School of Electrical Engineering	1.3,4.1,9.1	
	认识实习 Practice for Cognition	必修 Compulsory	1	1	短 2 学期 Short Semester 2	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	8.3,9.2,10.1,12.2	
	环境工程原理实验 Experiment for Principles of Environmental Engineering	必修 Compulsory	1	1	第 5 学期 Semester 5	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,4.1,4.2, 4.3,9.1	
	物理性污染控制实验 Physical Pollution Control Experiment	必修 Compulsory	1	1	第 5 学期 Semester 5	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,4.1,4.2, 4.3,9.1	
	固体废物处理与处置实验 Solid Waste Treatment and Disposal Experiment	必修 Compulsory	1	1	第 6 学期 Semester 6	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,4.1,4.2, 4.3,9.1	
	生产实习 Production Practice	必修 Compulsory	2	2	短 3 学期 Short Semester 3	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	8.3,9.2,10.1,12.2	
	课程设计 Course Design	必修 Compulsory	4	4	短 3 学期 Short Semester 3	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	2.2,3.1,3.2, 3.3,5.2,5.3, 9.1,10.1, 12.1	
	水污染控制工程实验 Water Pollution Control Engineering Experiment	必修 Compulsory	2	2	第 7 学期 Semester 7	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,4.1,4.2, 4.3,9.1	
	大气污染控制工程实验 Air Pollution Control Engineering Experiment	必修 Compulsory	2	2	第 7 学期 Semester 7	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.4,4.1,4.2, 4.3,9.1	

	毕业设计（论文） Graduation Design (Thesis)	必修 Compulsory	12	12	第 8 学期 Semester 8	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	1.5,2.3,3.2, 3.3,4.1,4.2, 4.3,5.1,5.2, 5.3,6.3,7.2, 10.1,11.1	含 1 学分的毕业实习
创新创业实践：创新创业训练计划项目、个性化实验、学科竞赛、创新讲座等 Innovation and Entrepreneurship Practice: Innovation and Entrepreneurship Training Program, Personalized Experiments, Subject Competition, Innovation Lectures, etc	创新创业训练计划项目 Innovation and Entrepreneurship Training Program	限修 Distributional Elective	2	2	7-8 学期 Semester 7-8	地球科学与环境工程学院 Faculty of Geosciences and Environmental Engineering	7.1,9.1, 9.2, 12.1, 12.2	主持或参与结题至少 1 项 Leading or participation at least one project conclusion
	个性化实验 Individual Experiment						7.1,9.1, 9.2, 12.1, 12.2	
	重点实验室向本科生开放工程实践项目 Engineering Practice Projects of Key laboratories Opening to Undergraduates						7.1,9.1, 9.2, 12.1, 12.2	
必修环节 A compulsory part 共 0 学分，其中必修 0 学分，限修 0 学分，选修 0 学分 A total credits of 0, including 0 for compulsory courses, 0 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
“第二课堂”项目：思想政治与道德素养类项目、学术科技与创新创业类项目、艺术体验与审美修养类项目、文化沟通与交往能力类项目、心理素质与身体素质类项目、社会工作与领导能力类项目、社会实践与志愿服务类项目 "The Second Lesson" Project: Ideological and Political Education and Moral Literacy Projects, Academic and Technological Innovation and Entrepreneurship Projects, Art Experience and Aesthetic Education Projects, Cultural Communication and Interpersonal Skills Projects, Psychological and Physical Health Projects, Social Work and Leadership Development Projects, Social Practice and Volunteering Projects	“第二课堂”项目 "The Second Lesson" Project	必修 Compulsory	0	0	1-8 学期 Semester 1-8	校团委 Communist Youth League Committee	6.1,8.1,8.2, 10.2,12.1	

大学生综合素质提升、学生体质达标测评 Comprehensive Quality Improvement Courses for College Students, Assessment of Students' Physical Fitness	大学生综合素质提升 Comprehensive Quality Improvement Courses for College Students	必修 Compulsory	0	0	1-8 学期 Semester 1-8	校团委 Communist Youth League Committee	6.1,8.1,8.2, 10.2,12.1	
	学生体质达标测评 Assessment of Students' Physical Fitness	必修 Compulsory	0	0	秋季学期 Fall semester	体育学院 School of Physical Education	8.1	
学分总计 Total Credits			162					